

EPIGASTRIC TUG *

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Epigastric tug is not uncommon but frequently it is unrecognized. Neither the patient's symptoms nor the physical findings fit the more commonly thought of surgical pictures. The pain and discomfort are entirely disproportionate to what one is sometimes able to demonstrate, yet the lesions disclosed at operation, and the subsequent relief are sufficient proof that epigastric tug on the falciform ligament may be responsible for pain more often than one might imagine.

Upon examination, all one is able to find in the condition referred to is a small subcutaneous tumor in the linea alba, between the umbilicus and ensiform cartilage. Indeed, on account of their small size, it is not always possible to palpate these tumors; but from the symptoms, and as a result of having epigastric tug in mind, one may, having excluded other conditions, infer their presence. The small tumors under discussion are sometimes spoken of as epigastric hernia, or preperitoneal areolar tumors, or simple lipoma. The condition under discussion, however, is not an epigastric hernia. Before arriving at a diagnosis of epigastric tug, it is necessary to eliminate as possibilities all those other types of hernia which may occur in the upper abdomen at or about the median line, ventral hernia, umbilical, post-operative, post-parturient, traumatic and other well recognized hernia should be excluded. Consideration in this discussion is therefore confined to the small areolar tumor coming through the linea alba between the umbilicus and ensiform cartilage, and commonly termed epigastric hernia.

A search of medical literature reveals little concerning the subject. Quervain says: "If the diagnosis of epigastric hernia were always made in time it would prevent many so-called dyspeptics wasting time on treatment for indigestion, for a simple surgical measure could at once restore the patient to health."

Maskowitz, during the past few years, has diagnosed hernia of the falciform ligament a number of times and reports having operated upon over twenty cases similar in character to those under discussion.

Considering for a moment the anatomy: The linea alba, in the median line of the abdomen, runs from the ensiform cartilage to the pubes. It is an aponeurosis formed by the sheaths of the recti muscles. Broad and distinct above the umbilicus, the linea alba diminishes in the lower abdomen and before reaching its insertion in the pubis almost or quite disappears, leaving the recti muscles nearly in contact with each other. The fibres of the linea alba run longitudinally, obliquely and transversely. The transverse fibres are the strongest, and not infrequently have gaps between them. The openings, or gaps, between the transverse fibres of the linea alba are the site of the type of hernia responsible for the tug, and they allow the subperitoneal fat to escape but not always to return.

At operation the herniated fat is found to have a constricted pedicle firmly grasped by the fibres of the slit in the linea alba. The peritoneum does not protrude and is separated from the linea alba by the transversalis fascia, but between the two is a certain proportion of fat, and it is this, the next adjacent tissue to the weak spots in the linea alba, that force their way through and become entrapped.

The falciform ligament is a reduplication of peritoneum. The lower attachment of the falciform ligament is along the line of the linea alba, from the umbilicus to the ensiform cartilage, and in its attachment spreads both ways from the midline, but more to the right than the left. The adipose tissue contained within its broadened layers, anterior triangular attached surface, is in close contact with the transversalis fascia. Given therefore an opening, or number of small openings in the transversalis fascia, the first tissue that could possibly be forced through would be the preperitoneal fat within the folds of the falciform ligament.

The openings in the transverse fascia are very small, and the component parts of the linea alba strong and inelastic, which may explain why the majority of these so-called epigastric hernia are small. Reviewing the mechanism of formation, Quervain states that the first protrusion is a mere lobule of fat, which increases by growth. If, however, the hernial development is greater than the fatty proliferation, or contains peritoneum or omentum, the case then becomes one of epigastric hernia. It is not possible to differentiate definitely between a true hernia, with reducible omentum, and a subserous lipoma.

The writer is of the opinion that the first cause of the small areolar tumor in the upper linea alba is encouraged by the blood vessels passing through the transversalis fascia and aponeurosis of the linea alba. Prolongations of the fascia follow these blood vessels, later followed by small globules of fat from the areolar tissue which, gradually accumulating in number, sooner or later become a recognized mass. As this mass of fat globules increases in size, it then becomes organized with either cicatricial or semi-fibrous bands, often forming a glistening capsule and simulating a true hernial sac. The mass flattens out in a button-like or mushroom shaped head, causing resistance to the constant tugging of the flexible falciform ligament, and this, under the strain of the more violent intra-abdominal stress, causes the so-called epigastric tug, with more or less severe or intermittent pain referred to this region.

PATHOLOGY

The writer has endeavored in a few instances, when operating upon the stomach, or making an exploratory incision in the upper abdomen, to study more carefully the linea alba and observe whether either small transverse or round openings did not normally exist without the presence of a tumor. This condition, however, was never observed. Aside from the organized areolar pad, or button subcutaneous in position or displaced from the folds of the falciform ligament, the transverse fascia and linea alba, making a permanent tug on the falciform ligament. There is no special path-

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ology of immediate danger to the patient except from the irritation and local congestion caused thereby. In case No. 4 of the operated cases, the writer felt so sure that he was dealing with a true hernia of omentum covered by a glistening fibrous capsule simulating peritoneum, that a free incision was made into the abdomen to the right of the median line. A probe was passed along side of the pedicle of the tumor through the opening in the transverse fascia and deflected to the right. The probe at no time entered the abdominal cavity, but remained within the folds of the falciform ligament. The tumor was then grasped with a forceps and the pull or tug on the falciform ligament could be plainly demonstrated. The impulse could be felt even to the anterior surface of the liver.

In case No. 3, which was operated under novocain before a class of students, the writer grasped the tumor with forceps and pulling upon it, asked the patient if that was the pain he complained of. The patient stated that it was and that the pain was very severe and went through to his stomach and back. The severe intra-abdominal pain from this experiment lasted several minutes. The size of the tumor varied in the writer's case from the size of a grain of wheat to an unshelled almond. The pedicle was always well organized and contained an unusually large blood supply for the size of the tumor. The pedicle was always adherent, and the tumors irreducible.

SYMPTOMS

Pain in the upper abdomen is invariably the first symptom. Case No. 3 was an alcoholic and the writer thought he was dealing with a case of gastritis. The areolar tumor was not observed on first examination. Patient was put on a milk diet, and receiving no relief after three days, he returned. At this time I definitely palpated and diagnosed a small areolar tumor in the epigastrium. In all cases (ten) the diagnosis was made by the writer. The patients did not know they had an epigastric tumor. The age of the patients varied from nineteen to fifty-five years. However, the development of this condition is marked by more or less positive signs. There is invariably pain at the site of the tumor, which is undoubtedly the seat of an active inflammatory process with more or less constant irritation. Each and every case had positive pain and tenderness at the site of the tumor. So constant has been this localized pain in all cases that in one of the operated cases the diagnosis was made on the symptoms and localized pain, although the tumor was not palpable. In another case, after demonstrating the presence of a tumor to my own satisfaction, I so flattened out the tumor by rough manipulation that I was later unable to demonstrate it to a colleague. At the operation which immediately followed, the tumor was found irreducible and flattened out to about the size and thickness of a dime. I would therefore suggest, at first palpation, very gentle manipulation with one finger.

The writer has never observed these tumors in children or women; they have all been in adult males. The tumors generally originate in the middle line, although, as previously stated, the

linea alba is a little wider in the upper abdomen and the tumor may be deflected to the right or left. Localized pain is the cardinal symptom, causing either acute or intermittent distress.

Differential diagnosis—In obese patients, especially if the tumor is small, the diagnosis may be difficult or quite impossible; the history with the onset of pain, the specific localization of a tender point in the upper linea alba, elicited by light pressure upon the abdominal wall, a pain that has no relation to stomach activity and often associated with exercise or intra-abdominal strain, will be a leading point. Tumors at or near the umbilicus are generally associated with umbilical hernia, a portion of which may be deflected upward by intervening transverse fibrous bands. Larger hernia in the epigastric region are not uncommon. True lipoma may be found in this region as well as any part of the body, or they may have originated in the falciform ligament, with the pedicle detached, and then become a simple unattached subcutaneous areolar tumor.

True epigastric hernia should have a peritoneal covering or sac. The writer has not observed this peritoneal covering in the series of cases referred to and does not consider them true epigastric hernia.

Villard, in *Lyon Chirurgical*, Nov. 1920, stated that epigastric hernia is merely a hernia of the falciform ligament of the liver through the linea alba.

It must not be overlooked, however, that while a patient may have a true epigastric tug, he may also have some other serious intra-abdominal lesion which should be carefully differentiated. It is stated in the literature that areolar tissue tumors in this region occur twenty times more frequently than epigastric hernia.

TREATMENT

This consists in removing the tumor or resistant mass and thereby relieving the tug on the falciform ligament. This relief may be accomplished under local or general anaesthesia. The areolar tumor should be teased apart in order to observe whether or not it contains a peritoneal sac, also to control the bleeding. The pedicle should be ligated. In one instance, the writer cut off the pedicle and was compelled to open the fascia in order to control the bleeding. The linea alba should be carefully examined because frequently more than one tumor exists. To prevent recurrence, the pedicle must be dislocated within and underneath the opening, and the fascia overlapped.

The writer has had five operative cases of this type and has also observed five other cases not operated on, but which from their clinical symptoms and localization, there was reason to believe they were similar in character. The operated cases have been completely relieved of their symptoms. The unoperative cases are still complaining of more or less intermittent distress, believing that their symptoms are due to more serious intra-abdominal troubles in the neighborhood of their gall-bladder or stomach.

A few days after discussing this paper with Dr. W. S. Porter, on August 2, he asked me to see a

case of what he considered an epigastric tug. The patient was an athletic young man, 24 years of age. He had a good history, also a good stomach and heart. The patient stated that while playing tennis the day before he felt a severe pain in his epigastrium. This pain was so severe as to cause him to stop playing. He thought possibly he had heart trouble.

Physical examination revealed only a small tumor in the linea alba. It was about one-third the distance between the umbilicus and ensiform cartilage. On palpation the patient complained of a tender point at the site of the tumor. When questioned as to whether this tender point was the only one, the patient said it was part of the pain, but that distress was deeper inside the abdomen, toward the back or under the arch of the ribs. The small epigastric tumor had not been observed before.

At operation a median incision through the skin was made over the linea alba underneath the subcutaneous fat. The small areolar tumor was demonstrated. The operator then opened the transversalis fascia, relieving the constricted tumor. A second tumor, or tug, was then discovered. This second tumor had not been diagnosed, it being quite small. The exposed areolar tissue preperitoneal, and the peritoneum of the falciform ligament were then exposed freely underlying the open wound. Dr. Porter, the operator, then grasped both tumors with separate forceps in order to ascertain how much pulling effect these tumors had on the falciform ligament, and was able to draw a considerable amount of the falciform ligament up into the wound, thus demonstrating clearly the pronounced tugging effect which they caused.

These tumors are assuming some industrial importance. The writer was consulted in a case before the California Accident Commission. The patient stated that while lifting a heavy tool-box, he received a sudden strain in his epigastrium and had considerable stomach distress. His family physician observed an epigastric tumor, and later operated for the same, making the report of a traumatic epigastric hernia. The doctor stated the hernia consisted of a small tumor of omentum, but had no peritoneal covering. So the tennis player, referred to in Dr. Porter's case, thought his trouble was due to strain. However, the operative findings of an organized pedicle of areolar tissue with a fibrous prolongation from the falciform ligament does not appear to be an acute affair. Its histological formation would seem to favor chronicity.

CONCLUSIONS

As in all other surgical procedures, a correct diagnosis is essential. A very small incision is recommended for removing these small tumors in order to avoid the appearance of an extensive operation, for the scar might confuse other diagnosticians, causing them to procrastinate should the patient later develop serious upper abdominal trouble.

The statement that the areolar tumor occurs twenty times more frequently than epigastric hernia, is only a conjecture of other operators, as no

statistics have been correlated as yet. The writer is of the opinion that small omental tumors are very rare in this region and quite foreign to this location, but that a small tug of peritoneum may occasionally be found. It is also hoped that others will not open the abdomen, as the writer did in one instance for an operation that can be performed by a more simple procedure.

On September 10, while associated with Chas. Coleman, who was about to perform a gastroenterostomy for carcinoma of the pylorus, at my request he made the incision in the upper linea alba. Preliminary to the incision, no epigastric tumor could be palpated. However, on exposing the transversalis fascia, a small areolar tumor was observed in the middle portion of the linea alba. This was the first case observed by me after operating many times in the median line for this purpose.

The opening in the fascia in this case was much larger than any previous case under observation, the opening being about the size of a slate pencil. The preperitoneal fat was not adherent in the opening, but a small pedicle of fat would bob up and down through the opening with each respiratory effort. This was not a true tug, as no effort at organization of the areolar pedicle had taken place. The patient had not complained of this condition, and it does not appear likely that he would until some organized resistance to the free action of the falciform ligament should occur. It simply goes to prove that this abnormality may occur even in the presence of malignancy.

DISCUSSIONS

Charles A. Dukes—I can readily see that the epigastric tug is going to assume some industrial importance. One of my associates recently sent a patient, age fifty-six, into the hospital for an epigastric hernia of traumatic origin. Upon examining this patient I found he had an epigastric button between the umbilicus and ensiform cartilage. It was very tender, and to this region the patient referred all his distress. However, the patient gave a history of having lost weight very rapidly during the past six months, with exhaustion. A suspicion of malignancy entered into my procedure following this case, so I deferred operation. The patient died six weeks later from general carcinomatosis. At autopsy I observed the typical falciform ligament tug which the reader of the paper has referred to this evening. Since making a closer study of the pathology of this organized tug, I am inclined to think it is a chronic affair and that some unusual strain aggravates the condition causing the patient to complain. I doubt very much if it should be considered an acute industrial accident.

Charles Coleman—At the request of Dr. Emerson, I have been looking for these small epigastric tumors in my upper abdominal cases during the past few months. I have also been making my incisions in the linea alba whenever possible. I had about given up the idea of finding this abnormality when I observed the case, which the reader has referred to this evening. In looking up this subject, Deaver mentions the fact that small openings may occasionally be found in the upper linea alba, and I think it is only when the fat of the falciform ligament becomes incarcerated in these openings that the patient complains. The epigastric tug, no doubt, causes the pain and distress, but I see no reason why it could not be considered an acute affair as well as a chronic condition. If it is an acute condition, why could it not arise from industrial trauma as well as any other type?